SECTION II

PHARMACEUTICAL CHEMISTRY

1. **Impurities in Pharmaceuticals**: Source and effect of impurities in Pharmacopoeial substances, importance of limit test, Principle and procedures of Limit tests for chlorides, sulphates, iron, heavy metals and arsenic

2 **Inorganic Pharmaceuticals**: Pharmaceutical formulations, market preparations, storage conditions and uses of

- **Haematinics:** Ferrous sulphate, Ferrous fumarate, Ferric ammonium citrate, Ferrous ascorbate, Carbonyl iron
- **Gastro-intestinal Agents:** Antacids: Aluminium hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, Calcium Carbonate, Acidifying agents, Adsorbents, Protectives, Cathartics.
- **Topical agents:** Silver Nitrate, Ionic Silver, Chlorhexidine Gluconate, Hydrogen peroxide, Boric acid, Bleaching powder, Potassium permanganate.
- **Dental products:** Calcium carbonate, Sodium fluoride, Denture cleaners, Denture adhesives, Mouth washes.
- **Medicinal gases:** Carbon dioxide, nitrous oxide, oxygen.
- Introduction to nomenclature of organic chemical systems with particular reference to heterocyclic compounds containing up to Three rings

- **Study of the following category of medicinal compounds with respect to classification, chemical name, uses, stability and storage conditions, different types of formulations and their popular brand names**
  - **Drugs Acting on Central Nervous System:**
    Anaesthetics: Thiopental Sodium, Ketamine Hydrochloride Propofol.
    Sedatives and Hypnotics: Diazepam, Alprazolam, Nitrazepam, Phenobarbital.
    Antipsychotics: Chlorpromazine Hydrochloride, Haloperidol, Risperidone, Sulpiride, Olanzapine, Quetiapine, Lurasidone.
    Anticonvulsants: Phenytoin, Carbamazepine, Clonazepam, Valproic Acid, Gabapentin, Topiramate, Vigabatrin, Lamotrigine.
    Anti-Depressants: Amitriptyline Hydrochloride, Imipramine Hydrochloride, Fluoxetine, Venlafaxine, Duloxetine, Sertraline, Citalopram, Escitalopram, Fluvoxamine, Paroxetine

- **Drugs Acting on Autonomic Nervous System: Sympathomimetic Agents:**
  Direct Acting: Nor- Epinephrine, Epinephrine, Phenylephrine
  Dopamine, Terbutaline, Salbutamol (Albuterol), Naphazoline, Tetrahydrozoline.
  Indirect Acting Agents*:* Hydroxy Amphetamine, Pseudoephedrine. Agents With Mixed Mechanism**:** Ephedrine, Metaraminol
  Adrenergic Antagonists: Alpha Adrenergic Blockers: Tolazoline, Phentolamine Phenoxybenzamine, Prazosin. Beta Adrenergic Blockers: Propranolol, Atenolol, Carvedilol,

Cholinergic Drugs and Related Agents: Direct Acting Agents: Acetylcholine, Carbachol, And Pilocarpine. Cholinesterase Inhibitors: Neostigmine, Edrophonium Chloride, Tacrine Hydrochloride, Pralidoxime Chloride, Echothiopate Iodide, **Cholinergic Blocking Agents:** Atropine Sulphate, Ipratropium Bromide, **Synthetic Cholinergic Blocking Agents**: Tropicamide, Cyclopentolate Hydrochloride, Clidinium, Bromide, Dicyclomine Hydrochloride,

- **Drugs Acting on Cardiovascular System: Anti-Arrhythmic Drugs**: Quinidine Sulphate,Procainamide Hydrochloride, Verapamil, Phenytoin Sodium, Lidocaine Hydrochloride, Lorcainide Hydrochloride, Amiodarone and Sotalol,
- **Anti-Hypertensive Agents**: Propranolol, Captopril, Ramipril, Methyldopate Hydrochloride, Clonidine Hydrochloride, Hydralazine Hydrochloride, Nifedipine, **Antianginal Agents**: Isosorbide Dinitrate,
- **Diuretics:** Acetazolamide,Frusemide, Bumetanide, Chlorthalidone, Benzthiazide, Metolazone, Xipamide,Spironolactone
- **Hypoglycemic Agents:** Insulin and Its Preparations, Metformin, Glibenclamide, Glimepiride, Pioglitazone,Repaglinide, Gliflozins, Gliptins
- **Analgesic and Anti-Inflammatory Agents:**Morphine Analogues, Narcotic Antagonists **Nonsteroidal Anti- Inflammatory Agents (NSAIDs) -** Aspirin, Diclofenac, Ibuprofen, Piroxicam, Celecoxib, Mefenamic Acid, Paracetamol, Aceclofenac**.**
- **Antifungal Agents:** Amphotericin-B, Griseofulvin, Miconazole, Ketoconazole, Itraconazole, Fluconazole, Naftifine Hydrochloride
- **Urinary Tract Anti-Infective Agents:** Norfloxacin, Ciprofloxacin, Ofloxacin, Moxifloxacin,
- **Anti-Tubercular Agents:** INH, Ethambutol, Para Amino Salicylic Acid, Pyrazinamide, Rifampicin, Bedaquiline, Delamanid, Pretomanid
- **Antiviral Agents:** Amantadine Hydrochloride, Idoxuridine, Acyclovir, Foscarnet, Zidovudine, Ribavirin, Remdesivir, Favipiravir
- **Antimalarials:** Quinine Sulphate, Chloroquine Phosphate, Primaquine Phosphate, Mefloquine, Cycloguanil, Pyrimethamine, Artemisinin
- **Sulfonamides:** Sulfanilamide, Sulfadiazine, Sulfamethoxazole, Sulfacetamide, Mafenide Acetate, Cotrimoxazole, Dapsone
- **Antibiotics:** Penicillin G, Amoxicillin, Cloxacillin, Streptomycin, **Tetracyclines:** Doxycycline, Minocycline, **Macrolides:** Erythromycin, Azithromycin, **Miscellaneous:** Chloramphenicol, Clindamycin

BIO CHEMISTRY AND CLININICAL PATHOLOGY

1.Carbohydrates

- Definition, classification with examples, chemical properties
- Monosaccharides - Structure of glucose, fructose, and galactose
- Disaccharides - structure of maltose, lactose, and sucrose
- Polysaccharides - chemical nature of starch and glycogen

Qualitative tests and biological role of carbohydrates

2. **Proteins**

- Definition, classification of proteins based on composition and solubility with examples
- Definition, classification of amino acids based on chemical nature and nutritional requirements with examples
- Structure of proteins (four levels of organization of protein structure)
- Qualitative tests and biological role of proteins and amino acids

Diseases related to malnutrition of proteins

3. **Lipids**

- Definition, classification with examples
- Fatty acid classification – Based on chemical and nutritional requirements with examples
- Structure and functions of cholesterol in the body
- Lipoproteins - types, composition and functions in the body
- Qualitative tests and functions of lipids

4. Enzymes

- Definition, properties and IUB and MB classification
- Factors affecting enzyme activity
- Mechanism of action of enzymes, Enzyme inhibitors
- Therapeutic and pharmaceutical importance of enzymes

5. **Vitamins**

- Definition and classification with examples
- Sources, chemical nature, functions, coenzyme form, recommended dietary requirements, deficiency diseases of fat-and water-soluble vitamins

6. **Metabolism** (Study of cycle/pathways without chemical structures)

- Metabolism of Carbohydrates: Glycolysis, TCA cycle and glycogen metabolism, regulation of blood glucose level. Diseases related to abnormal metabolism of Carbohydrates
- Metabolism of lipids: Lipolysis, β-oxidation of Fatty acid (Palmitic acid) ketogenesis and ketolysis. Diseases related to abnormal metabolism of lipids such as Ketoacidosis, Fatty liver, Hypercholesterolemia
- Metabolism of Amino acids (Proteins): General reactions of amino acids and its significance– Transamination, deamination, Urea cycle and decarboxylation. Diseases related to abnormal metabolism of amino acids, Disorders of ammonia metabolism, phenylketonuria, alkaptonuria and Jaundice.
- Biological oxidation: Electron transport chain and Oxidative phosphorylation

7. **Minerals**: Types, Functions, Deficiency diseases, recommended dietary requirements

8. **Water and Electrolytes**

- Distribution, functions of water in the body
- Water turnover and balance
- Electrolyte composition of the body fluids, Dietary intake of electrolyte and Electrolyte balance, Dehydration, causes of dehydration and oral rehydration therapy

9. **Organ function tests**
   - Functions of kidney and routinely performed tests to assess the functions of kidney and their clinical significances
   - Functions of liver and routinely performed tests to assess the functions of liver and their clinical significances, Lipid profile tests and its clinical significances
10. **Introduction to Pathology of Blood and Urine**
   - Lymphocytes and Platelets, their role in health and disease
   - Erythrocytes - Abnormal cells and their significance, Normal and Abnormal constituents of Urine and their significance

PHARMACOTHERAPEUTICS

Definition, etiopathogenesis, clinical manifestations,
Non – pharmacological and pharmacological management of the diseases associated with:

(a) Cardiovascular System
- Hypertension
- Angina and Myocardial infarction
- Hyperlipidaemia
- Congestive Heart Failure

(b) Respiratory System
- Asthma, COPD

(c) Endocrine System
- Diabetes, Thyroid disorders - Hypo and Hyperthyroidism

(d) Central Nervous System
- Epilepsy
- Parkinson's disease
- Alzheimer's disease
- Stroke
- Migraine

(e) Gastro Intestinal Disorders
- Gastro oesophageal reflux disease
- Peptic Ulcer Disease
- Alcoholic liver disease

(f) Haematological disorders
- Iron deficiency anaemia
- Megaloblastic anaemia

Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis

(g) Infectious diseases
- Tuberculosis

- Pneumonia
- Urinary tract infections
- Hepatitis
- Gonorrhoea and Syphilis
- Malaria
- HIV and Opportunistic infections
- Viral Infections (SARS, CoV2)

(h) Musculoskeletal disorders

- Rheumatoid arthritis
- Osteoarthritis

(i) Dermatology

- Psoriasis
- Scabies
- Eczema

(j) Psychiatric Disorders

- Depression
- Anxiety
- Psychosis